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ABSTRACT

This study investigates the success of preservice elementary social studies teachers in acquiring effective questioning skills using a self-instructional Competency-Based Teacher Education (CBTE) module and tests the possible relationship between a teacher personality variable and a measure of their questioning ability. The subjects were divided into two groups consisting of eight "high extraverts" and eight "low extraverts" according to their Myers-Briggs Type Indicator scores. The "teacher-directed" group received a conventional, in-class treatment of questioning behaviors for a 3-week period and the "self-directed" group used the CBTE module to learn questioning skills. Each student was required to conduct a 10-minute mini-lesson utilizing questioning skills to introduce a concept. Using the Questioning Strategies Observation System, data collected during the mini-lesson were transformed into four measures of questioning ability. Results show no significant difference between the treatment groups in their questioning ability and indicate "high extraverts" spent less time using the modules than the "low extraverts" but spent almost three times as many minutes interacting with the instructor. "Low extraverts" spent a great deal of time working on the CBTE modules but spent an average of 14 minutes interacting with the instructor. (Eight tables and a 17-item bibliography are included.) (PD)

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THE DEVELOPMENT AND IMPLEMENTATION OF A COMPETENCY-BASED TEACHER EDUCATION MODULE

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In recent years educators have attached a strong priority upon the need to develop curricula and instructional behaviors to accommodate the individual differences found among learners. Prominent among several early efforts to deal constructively with this matter was the development of Individually Prescribed Instruction at the University of Pittsburgh (Research for Better Schools, 1971). The pioneer field work and success of IPI was followed shortly by the introduction of individualized instruction at Nova High School in Florida. The "Nova" approach involved using Learning Activity Packages (Wolfe and Smith, 1968). A later and somewhat different approach to individualized learning was suggested by Flanagan (1970) in his proposal for Project PLAN (Program for Learning in Accordance with Needs). These programs attracted widespread interest and attention and initiated alternative approaches for individualizing learning in the schools.

Nevertheless, changes in the focus and the goals of instruction were not translated into classroom practice. Writing early in 1971, John Goodlad described teaching that he had recently witnessed in somewhat less than glowing terms:

> Instruction is characterized by much talking and questioning by the teacher. There is little apparent pedagogical use of psychological principles such as motivation and reinforcement. There is little evidence of differentiated techniques, timing or content to recognize individual differences among students. There is much drill on specific facts with relatively little inductive reasoning designed to generate hunches and hypotheses. Textbooks dominate as the materials of instruction (Goodlad, 1971, p. 158).

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Goodlad's observation merely reiterated what other researchers such as Bellack and Dravitz (1963), Smith and Meux (1966), and Flanders (1965) had previously reported. These studies were unanimous in their descriptions of classroom interaction patterns. All testified to observing extremely high proportions of teacher talk concomitant with short student responses of a low cognitive level. Such an atmosphere is incompatible with a goal providing instructional behaviors varied according to the individual needs of students.

While educators concur in their support of the need to provide for individual differences in curriculum and instruction, they appear to experience considerable difficulty in operationalizing that goal into specific instructional behaviors. Swenson (1962) has addressed this problem and charges that at least part of the disparity between theory and classroom implementation of provision for individual differences must be attributed to the preparation provided by the colleges of teacher education. She writes:

> In the pre-service preparation of teachers, the task is doubly difficult. Not only is it necessary to set up the goal of individualization of instruction as a prerequisite to the instruction of children but those responsible for the professional education of teachers must somehow also practice individualization while preparing their students to practice it. No matter how earnestly they talk and write about individualization, the talking and the writing will have less than optimum effect unless they practice individualization of learning experiences in their instruction of those who would subsequently be inducted into the teaching profession (1962, p. 287).

A review of research on teaching for individual differences as it is practiced in colleges of teacher education reveals a region of remarkable neglect. A survery of the methodology literature reveals few efforts directed as individualizing instruction in teacher preparation programs. Teacher educators appear cognizant of and interested in the efforts of individualized teaching and learning yet they demonstrate little manifest effort to organize

their own curricula along the lines they urge upon the public schools. Weisgerber (1971) noticed this pattern and commented:

> There has been no widespred adoption of individualization as a modus operandi throughout college level curricula. This seems ironic not only because of the leadership role that colleges and Universities are supposed to play, but also because they, more than any other sector of education, are being pressed, even challenged, by their student body to become relevant and to consider the dignity and worth of the individual (p. 313).

Perhaps equally unsettling is the notion that few teacher training institutions appear equipped of immediately desirous of training preservice teachers how to individualize their own instruction in the public schools. Thus one observes the curious paradox of teachers being expected to provide for the individual differences of students while they have had no instruction in this skill and have never experienced a model of individualized learning in their own educational preparation.

In several institutions, however, efforts are currently under way to develop and implement programs of teacher preparation which incorporate some aspects of individualized teaching and learning. Curiously, most institutions which are moving to redress this anomaly have done so while developing models of competency-based teacher education (CBTE) programs. Schools making progress in this direction include the following institutions: Brigham Young University (Baird et al., 1971), Weber State University (Burke, 1972), The University of Toledo (Dickson, 1972), Winthrop College (S.C.) (McClendon, 1969) and Southwest Minnesota State College (Bechtol, 1972).

In each case these colleges have generated modules or learning packages with behavioral objectives that represent the terminal skills which each pre-service teacher will possess prior to being certified to teach in the public schools. These modules, then, serve as one mode of individualizing instruction at the college level. They also serve as a model of at least

one strategy for accommodating individual differences which the teacher should be able to apply in his classroom in the public schools.

As one might anticipate, little research has been done to evaluate the effectiveness of CBTE packages as an instructional alternative. In only several instances have studies been completed which compare the performance over the same objectives of students who have utilized CBTE packages and those who have received more, conventional in-class treatments. These writers felt such an investigation might prove both useful and interesting.

DEVELOPMENT OF THE CBTE MODULE

For the purposes of the investigation the writers developed a self-instructional module designed to assist students in "The Acquisition of Questioning Skills." The module utilized an individualized format described by Trueblood (1971). In this mode of instruction the student is provided in the package with a list of behaviorally-stated terminal objectives. The student is also provided with a bibliography of media, educational materials and experiences which should assist him in attaining the desired terminal performance. He is free to select from the bibliography those materials or experiences which he believes will be of most benefit in enabling him to meet the objectives. Students are also free to locate their own materials or to seek teacher tutorial assistance. The student is also provided with pretests and posttests for each behavioral objective.

The CBTE module utilized in this study had as its prime behavioral objective the requirement that each student conduct a ten minute mini-lesson in which he utilized questioning skills to introduce a concept. The lesson, which was presented as both pre- and posttests, was observed and recorded

by an observer trained in the use of the Questioning Strategies Observation System (QSOS) (Davis and Morse, 1970).

THE PURPOSE AND DESIGN OF THE STUDY

The purpose of this study was to investigate the success of pre-service elementary social studies teachers in acquiring effective questioning skills using a self-instructional CBTE module. A further concern of the study was to test the possible relationship between a teacher personality variable and measures of their questioning ability.

The investigation compared two methods of teaching questioning skills to pre-service teachers. The students which comprised the sample (n=32) in the experiment were enrolled during the Winter Term in one section of Elementary Education 433 at The Pennsylvania State University.

Prior to the study the Myers-Briggs Type Indicator (MBTI) (Briggs and Myers, 1962) was administered to all subjects. The instrument yielded four measures of personality data. Utilizing the scores reflecting "extraversion level" the subjects were randomly assigned by level to two treatment groups. As a consequence each treatment group was composed of eight subjects identified as "high extraverts" and eight subjects who were classified as "low extraverts" according to their MBTI scores.

One group, identified in the study as "teacher-directed," received a conventional, in-class treatment of questioning behaviors for a three-week period. The experimental group, identified as "self-directed," operated outside the conventional classroom setting and proceeded to learn questioning skills using the CBTE module which covered the same objectives as the contrast group. The experimental group functioned relatively independent of teacher influence.

The data collected during the minilessons using the QSOS was transformed into four measures of questioning ability. The four measures were "question quantity," "cognitive quality," "cognitive quantity," and "tactical versatility." "Question quantity" supplied a simple index of question frequency. "Cognitive quality" provided evidence relating to the frequency of high cognitive questions asked by a teacher. "Cognitive quantity" provided an indication of the proportion of cognitive questions a teacher asked. The "tactical versatility" measure indicated the number of different kinds of questions utilized by the teacher.

RESULTS

Research hypotheses were established around the four questioning indices yielded by the QSOS. The data were treated using analysis of variance in a treatment-by-levels design. The data analysis indicated no significant difference between the treatment groups in their questioning ability as reflected in the four indices yielded by the QSOS. As a result the data analysis indicated no support for the hypotheses that students using a CBTE module during a three-week period could demonstrate significantly different questioning behaviors in a minilesson than students who had experienced an in class, "teacher-directed" treatment. The summary tables of gain score data is presented for each of the questioning indices in Tables 1, 2, 3, and 4.

Insert Tables 1, 2, 3 and 4 Here

Table 1

QUESTION QUANTITY:
ANALYSIS OF VARIANCE

Source of Variation	D/F	Sum of Squares	Mean Square	F Ratio
Extraversion	1	36.13	36.13	0.327
Treatment	1	78.13	78.13	0.708
Interaction	1	220.50	220.50	1.999
Error	28	3088.75	110.31	
Total	31	3423.5		

Table 2

COGNITIVE QUALITY:
ANALYSIS OF VARIANCE

Source of Variation	D/F	Sum of Squares	Mean Square	F Ratio
Extraversion	1	0.1861	0.1861	0.003
Treatment	1	9.9013	9.9013	0.180
Interaction	1	21.8791	21.8791	0.397
Error	28	1543.4386	55.1728	
Total	31	1575.4051		

Table 3

COGNITIVE QUANTITY:
ANALYSIS OF VARIANCE

Source of Variation	D/F	Sum of Squares	Mean Square	F Ratio
Extraversion	1	348.480	348.480	1.261
Treatment	1	2.761	2.761	0.010
Interaction	1	149.645	149.645	0.542
Error	28	7737.322	276.333	
Total	31	8238.219		

Table 4

TACTICAL VERSATILITY:
ANALYSIS OF VARIANCE

Source of Variation	D/F	Sum of Squares	Mean Square	F Ratio
Extraversion	1	0.78125	0.78125	0.144
Treatment	1	0.03125	0.03125	0.006
Interaction	1	0.03125	0.03125	0.006
Error	28	151.87500	5.42411	
Total	31	152.71875		

An investigation of gains on each of the four indices of questioning ability for the entire group failed to reflect significant differences in learning which could be attributed to treatment effects, except in the case of the "tactical versatility" measure. These results are presented in Table 5.

Insert Table 5 Here

An investigation of "extraversion level" as a factor did not reveal significant differences between the groups on any of the questioning indices. No interactions were present between treatment group assignment and "extraversion level."

Several ancillary questions were investigated in addition to the research hypotheses. These questions were directly related to package usage within the experimental treatment group. An examination of the relationship between the amount of time spent using the package and gain scores in questioning ability led to a significant correlation with "tactical versatility" scores but with none of the other three measures or questioning ability. (See Table 6.) An investigation of the relationship between the amount of

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Insert Table 6 Here

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time spent interacting with the instructor and the four gain scores in questioning ability yielded no significant correlations. (See Table 7.)

Table 5

THE t-TEST FOR GRAND MEAN GAIN SCORES OF QUESTIONING MEASURES

Measure	N	Mean	D.F.	Obtained	Tabled t value .05 level
Question Quantity	32	2.625000	28	1.4136	2.048
Cognitive Quality	32	1.375625	28	1.0489	2.048
Cognitive Quantity	32	-1.268749	28	-0.4317	2.048
Tactical Versatility	32	1.093750	28	2.6561[a]	2.048

[a]Significant at .05 level.

All relationships obtained in both cases were viewed as a function of chance fluctuations. An examination of the media preference among the CBTE treatment

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Insert Table 7 Here

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group revealed a decided preference for reading or symbolic media as opposed to audio-visual, multi-media opportunities.

An interesting by-product to the ancillary questions may be noticed in the data revealed in Tables 8 and 9. The tables communicate the time spent interacting with the instructor and the time spent using the package for each subject with the "high extravert" and "low extravert" cells. The results suggest that introverted subjects averaged 100 minutes longer using the package when compared to the extroverted students. The extraverted students, however, averaged three times as many minutes interacting with the instructor when compared to their introverted counterparts.

Insert Table 8 and 9 Here

DISCUSSION

This study has provided tentative support for the efficacy of individualizing certain aspects of a teacher education program. That significant gains in learning failed to occur within the three-week experimental period is immaterial compared to the fact that pre-service teachers can effectively learn questioning skills through a self-directed, self-instructional CBTE module and do so as effectively and with the same results as students who

TABLE 6

PRODUCT-MOMENT CORRELATIONS BETWEEN QSOS GAIN SCORES AND THE NUMBER OF MINUTES SPENT WORKING ON THE SELF-DIRECTED LEARNING PACKAGE

	Q. QN.	C. QL.	C. QN.	T. V.
TIME IN MINUTES	-0.288	-0.245	-0.083	0.520[a]

[a]Significant at .05 level.

TABLE 7

PRODUCT-MOMENT CORRELATIONS BETWEEN QSOS GAIN SCORES AND THE NUMBER OF MINUTES SPENT INTERACTING WITH THE INSTRUCTOR

	Q. QN.	C. QL.	C. QN.	T. V.
TIME IN MINUTES	0.123	0.244	0.377	0.199

Table 8

RECORD OF MINUTES SPENT USING
SELF-DIRECTED LEARNING PACKAGE

N		Total Minutes
1		335
2		185
3		243
4	High Extraverts	360
5	$\bar{X}_{he} = 264.4$	270
6		165
7		275
8		285
9		200
10		1230
11		205
12	Low Extraverts	450
13	$\bar{X}_{le} = 383.1$	290
14		180
15		315
16		195

$\bar{X} = 323.938$

Table 9

RECORD IN MINUTES OF INTERACTION TIME SOUGHT BY SUBJECTS USING THE SELF-DIRECTED LEARNING PACKACE

N		Total Minutes
1		58
2		0
3	High Extraverts	10
4		45
5	$\bar{X}_{he} = 42.6$	41
6		16
7		17
8		74
9		48
10		3
11		25
12	Low Extraverts	0
13		10
14	$\bar{X}_{le} = 14.7$	8
15		15
16		9

$\bar{X} = 23.69$

had dealt with the same skills in a formal classroom setting. This result may have far reaching implications when it has been confirmed and buttressed with the results of future investigations using this same mode of instruction. At this point, however, two things become clear. First, no reason exists to prevent certain aspects of teacher education from becoming individualized. To the contrary, much evidence now exists to recommend such a practice. On one hand is the obvious benefit of modifying an instructional sequence to accommodate the cognitive style of the individual learner in order that learning will be expedited and facilitated. Furthermore, there is the benefit of pre-service teachers participating in at least one mode of individualized instruction. This latter point is particularly cogent since students who graduate from colleges of teacher education are expected to individualize their instruction in the schools.

A second implication of this study stems from the examination of student personality characteristics as a possible source of variation upon which to assign particular individuals to certain instructional treatments. Previous research has shown that personalogical variables may account for differential patterns of learning rate, cognitive style, and individual response to varying instructional modes. Congruence between certain instructional treatments and particular personal aptitudes have been especially noted in students' response to CAI, programmed learning materials, and modes of instruction utilizing heavy components of audiovisual media as compared to more conventional, group-oriented treatments. On the whole, however, few significant contributions have been made in the identification of specific instructional modes. This study has been no exception in failing to obtain statistically significant results or in failing to yield an aptitude-treatment interaction. Nevertheless, it seems important to note the pattern found among learners who had been

identified as "high extraverts" or "low extraverts" on the basis of MBTI scores. The "high extraverts" spent less time using the module than the "low extraverts" but they spent almost three times as many minutes interacting with the instructor. Students assigned to the "low extravert" category spent a great deal of time working on the CBTE module but an average of only fourteen minutes interacting with the instructor. This finding should certainly prove useful in assigning specific types of students to a particular instructional mode.

Until recently little attention had been given to the possibility of individualizing instruction within a teacher education program. Perhaps part of that neglect has been a result of the widespread belief that college students represent such a homogeneous group in terms of abilities that few variables could be identified upon which instruction could effectively be differentiated. Also the logistics associated with the objective of individualizing instruction among relatively large groups of students has mediated against the possibility of individualizing on a large scale. The evidence gathered from this experiment as well as the increasing interest in college-wide CBTE programs indicates to these writers the utilization of self-instructional, open-ended learning modules affords educators at least one promising opportunity to practice what we preach!

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